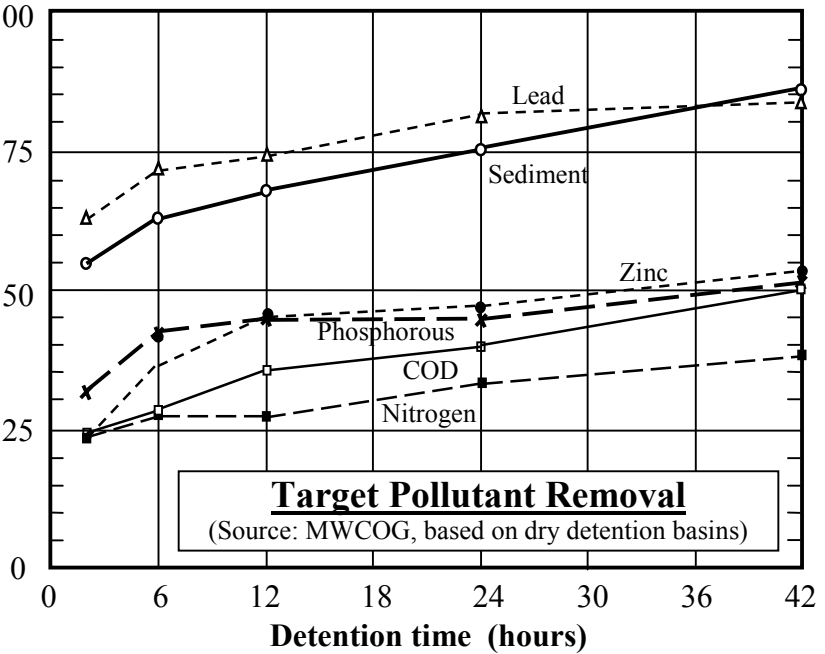


FIRST FLUSH STORMWATER TREATMENT

First flush is defined as the initial or early stage of stormwater runoff from a storm event, which commonly delivers a disproportionate amount of previously accumulated pollutants. The first flush volume is calculated as the first one-half (½) inch of direct runoff from the entire contributing drainage basin or 4500 cubic feet, whichever is greater. This first flush volume must be detained for a drawdown time of 24 to 72 hours, or otherwise treated to meet or exceed the pollutant removal goals of a standard 24-hour detention time as illustrated in the chart below.

% Pollutant Removal



The typical first flush treatment practice is an extended dry detention basin with an underdrain or rock filter to keep the outlet functional. Other innovative practices (such as sand filters, grassed swales, wetlands, retention basins, catch basin filters, and underground treatment devices) may be acceptable if the overall level of pollution reduction is shown to be equivalent or better than the standard removal rates for 24-hour stormwater detention. (Approximate goals are: Lead 80%, TSS 75%, Phosphorous 40%, Zinc 45%, Nitrogen 30%, COD 35%)

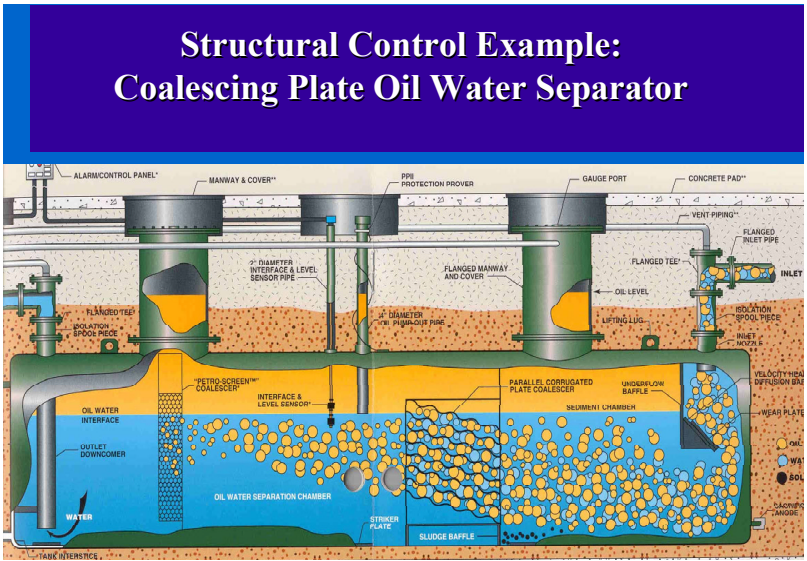
First flush treatment is required for residential development with 5 lots and/or 5 acres, commercial development of 1 acre or more, any development or road construction which adds ½ acre of impervious surface, or redevelopment on previously developed property.

SPECIAL POLLUTION ABATEMENT PERMIT

Some land uses are known to produce pollutants very detrimental to stormwater quality that are not adequately treated by the standard first flush detention basins. A Special Pollution Abatement Permit (SPAP) is required to ensure that best management practices are used to improve runoff quality from these land uses. A SPAP must be obtained for the following land uses:

- Any vehicle, truck, or heavy equipment maintenance, fueling, washing, or storage area (i.e. car lots, fuel stations, equipment rental, car washes).
- Any property containing 400 parking spaces or 120,000 ft² parking area.
- Recycling and/or salvage yard facilities.
- Restaurants, grocery stores, and other food service facilities.
- Commercial facilities with outside animal housing areas (i.e. animal shelters, fish hatcheries, kennels, stables, veterinary clinics, zoos).
- Other producers of pollutants identified by the Engineering Director from information provided or estimated from scientific study.

The SPAP application may be obtained from the Engineering Division BMP manual website. The requirements of the SPAP are site specific but most often require both management controls and structural controls to remain in place after development is completed. The SPAP is a renewable 5-year permit that requires periodic review of the controls and reapplication. Management controls may include spill prevention plans, parking lot vacuuming, recovery plans for power washing, policies preventing outside storage, employee training, etc. Structural controls must be designed to treat the 1-yr storm and to effectively prevent non-point source pollutants from leaving the site. Common structural controls include sand/media filters, vortex chambers, oil/water separators, wet ponds, filter/buffer strips, etc.



PLAT AND EASEMENT REQUIREMENTS

Stormwater quality facilities must be constructed on property dedicated by easement for that purpose, and built according to the design plans approved by the City Engineering Division. The location of all facilities and easements must be shown on a property survey plat recorded with the Knox County Register of Deeds. A Registered Land Surveyor must prepare and certify the plat in compliance with all state and local regulations. A new stormwater quality facility will require a new or partial plat to be recorded.

Two types of easements are required for water quality facilities: **1) Facility Easements** and **2) Access Easements**. A *Facility Easement* encompasses the facility, whereas an *Access Easement* provides *traversable* access from a public road to the facility. A *facility easement* will always be required. An *access easement* is typically not required at locations where the facility easement directly adjoins a public street and there is a fully traversable route at least 20 feet wide with a maximum slope of 15%. Access easements may not be merged with facility easements. Construction of a roadway within an access easement is not typically required; however, the route must not contain permanent structures, trees, retaining walls, masonry fences, etc. Information that must be shown on the plat includes:

- Recorded location of the legal document entitled “Covenants for Permanent Maintenance of Stormwater Facilities”.
- A standardized note stating that the property owner is responsible for maintaining all stormwater facilities on his property.
- Facility easement boundaries plotted, with metes & bounds labeled (bearings to nearest minute or better; distances to nearest hundredth of a foot). Easements shall be labeled as "Water Quality Easement" and "20-Ft Water Quality Facility Access Easement" when appropriate.
- For facility easements that do not abut a public road, a tie line plotted (light dashed line) from a corner of the easement to a corner of the property, with bearing and distance of the line labeled.
- Area of facility easements labeled in square feet (minimum size to be approved by City Engineering Division, typically 20 ft x 20 ft).
- Perpendicular width of access easements shown graphically within the easement (minimum width is 20 feet).
- Access easement centerline and right-of-way lines plotted, with metes & bounds of one or the other labeled (bearings to nearest minute or better; distances to nearest hundredth of a foot).
- Survey information locating access easements along the public road right-of-way.
- Additional information, if needed to compute metes & bounds closures for each facility and access easement independently of each other, and to fully locate easements on the ground by field survey.

PERFORMANCE BOND AND MAINTENANCE AGREEMENT REQUIREMENTS

A Performance and Indemnity Agreement provides assurance that the City of Knoxville will be reimbursed for assuming the costs of required specifications in the event the Principal is unable to complete the required work. The Plans Review Engineer determines when the Agreement is required as outlined in Sections 22.5-5 and 22.5-27(k) of the Stormwater and Street Ordinance and the dollar amount based on “actual construction or potential remediation expenses”. The Performance and Indemnity Agreement is prepared by the Engineering Division and may be guaranteed by a cashier’s check, letter of credit, or a surety bond.

When a stormwater detention and/or stormwater quality facility is required for development of a site, the property owner, including any subsequent owner(s), is responsible for perpetual maintenance of the facility. Therefore, the City of Knoxville requires the property owner to execute and record a document called “Covenants for Permanent Maintenance of Stormwater Facilities” (CPMSF). This document is prepared by the Engineering Division based on information provided by the property owner.

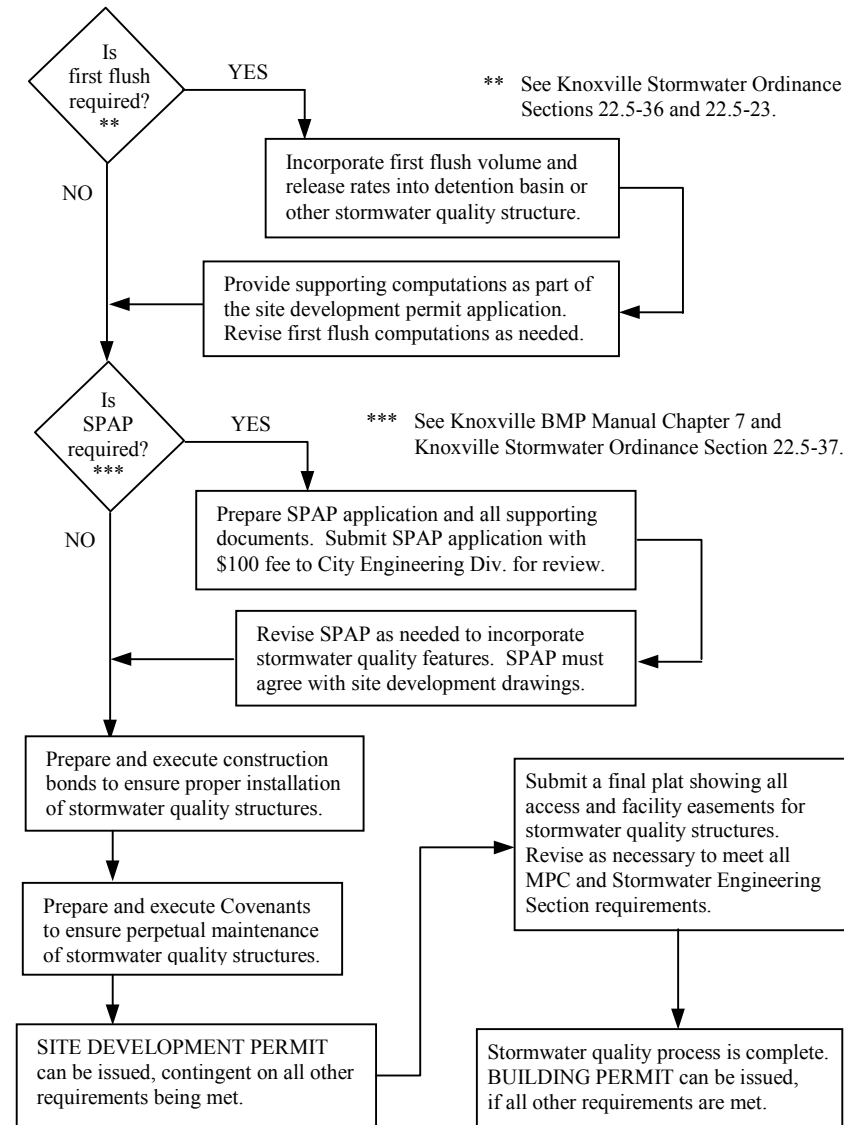
EROSION & SEDIMENT CONTROL

The City of Knoxville’s Stormwater and Street Ordinance requires all site development projects to utilize erosion and sediment controls to prevent degradation of water quality from construction site runoff. Typical erosion and sediment control measures include silt fences, check dams, sediment basins, and vegetation establishment. Erosion and sediment controls must comply with the Erosion and Sediment Control Handbook produced by the Tennessee Department of Environment and Conservation. Guidance can also be obtained from the City of Knoxville’s Best Management Practices Manual, which can be viewed and downloaded from the City’s web site at <http://www.cityofknoxville.org/engineering>.

An erosion and sediment control plan must be submitted to the City of Knoxville Engineering Division for all site development projects, except for the construction of a single residential house with less than 10,000 square feet disturbed area.

The City of Knoxville requires the application of temporary seeding to graded areas when grading operations are temporarily halted for more than 14 days and final grading of exposed surfaces is to be completed within 1 year. Permanent seeding is required when grading operations are completed and all other construction operations will not adversely impact the site area.

STORMWATER QUALITY PROCESS FLOWCHART



Water Quality Requirements for New Development

May 2005



CITY OF KNOXVILLE
BILL HASLAM, MAYOR



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